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Webster County/WMP

February 19, 1986

Mr. Joe Helterbrand
Dugan & Helterbrand Co.
190 George Street
Marshfield, MO 65706

Dear Mr. Helterbrand:

Please find enclosed the copy of the Site Inspection Sampling Report for the Dugan & Helterbrand site in Webster County, Missouri.

There has not yet been a determination made on allowable levels of cyanide in the spill areas. The results that are listed equate to parts per million.

We will keep you advised of the status of the site.

Sincerely,

SPRINGFIELD REGIONAL OFFICE

A handwritten signature in cursive script, appearing to read "Charles L. Kroeger".

Charles L. Kroeger
Environmental Specialist

CLK/cg

Enclosure



S00048823
SUPERFUND RECORDS

HAZARDOUS WASTE INVESTIGATION
SITE INSPECTION REPORT

DUGAN & HELTERBRAND COMPANY, INC.
WEBSTER COUNTY, MISSOURI

1. Name of Facility
2. Location
3. Date of Inspection
4. Inspector
5. Date of Report
6. Date of Revision

PREPARED BY:

CHARLES L. KROEGER
ENVIRONMENTAL SPECIALIST
SPRINGFIELD REGIONAL OFFICE
MISSOURI DEPARTMENT OF NATURAL RESOURCES

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I. EXECUTIVE SUMMARY

The Dugan & Helterbrand Site is located in Southwest Missouri in the City of Marshfield in Webster County. The company is a silver recovery operation which formerly used a cyanide solution to remove silver from film chips. Although it was designed to reduce cyanide to cyanates then to carbondioxide and nitrogen, the treatment process failed to adequately reduce the cyanide on the chips before they were shipped to the landfill. Subsequent investigations disclosed that there had been two minor spills at the plant site, both involving cyanide waste. A site inspection has also been completed on the landfill receiving the waste film chips (Webster County Landfill).

II. BACKGROUND

A. Location of Site

The Dugan and Helterbrand Site is located in southwest Marshfield in an industrial area. To get to the site travel 0.6 miles southeast on Highway 38 from Interstate 44 to Old Highway 66. Travel southwest on Old Highway 66, 0.2 miles to George Street. Turn south on George Street and go 0.2 miles to the entry drive of Dugan & Helterbrand which is on the east side of the road.

The legal description of the property is SE 1/4, SE 1/4, NW 1/4, Section 9, T30N, R18W, Webster County, Missouri, Marshfield Quadrangle. The coordinates are Latitude 37° 19' 58" - Longitude 92° 55' 20".

B. Geographic Setting

The Dugan & Helterbrand Site is located in an industrial setting at the edge of Marshfield. There is a shopping center 0.2 miles to the northeast, residences about 0.1 miles to the west and agricultural pastureland adjoining the site to the north. A railroad line adjoins the site to the south and separates it from developed industrial property. The populated town of Marshfield lies to the north and east of the site with some residential development to the west. The area beyond the industrial development to the south is generally agricultural with rolling pastureland and rural home settings.

The site is located on a relatively flat summit of about two square miles. The summit divides drainages which make up the headwaters of the Pomme de Terre River, the Niangua River and streams that flow to the James River.

There are at least four buildings on the site with the area between the buildings consisting of poured concrete slab. The rest of the site is generally gravel or asphalt. There are some open areas on the perimeters consisting of grass or other vegetative cover.

C. Site Ownership History

Mr. Joe Helterbrand indicated that the property is owned by the Dugan & Helterbrand Company, Incorporated of which he is president. All activities related to the cyanide process have taken place since the aforementioned company has owned the property.

D. Site Use History

The Dugan & Helterbrand Company was first investigated in 1983 by Mr. Burt McCullough when he visited the facility to give technical assistance and determine the compliance status of the plant. At that time it was disclosed that Dugan & Helterbrand used a cyanide process to remove the silver from the hammered film chips, the chips were then treated with a sodium hyperchlorite solution and then disposed of at the Webster County Landfill. The chips were stored on site in dumpsters after they were removed from the concrete tanks. The solutions were recycled and recharged. No mention was made of spills or overflows that had occurred.

At the request of DNR, Mr. Helterbrand applied for and received resource recovery certification and special waste disposal authorization. The certification allowed him to continue to reclaim silver and the special waste disposal authorization gave approval to dispose of the treated film chips at the Webster County Landfill.

In February, 1985, an inspection and sampling were performed at the Webster County Landfill. During that time a sample was collected of some treated film chips that had been disposed of there. The results indicated cyanide concentrations of 2136 ppm in the chips and 1.07 ppm in the leachate from the landfill. (The Webster County Landfill is also on the list for a Site Inspection Report.)

On May 29, 1985, Bill Ralston, Environmental Investigator, interviewed two past employees of Dugan & Helterbrand who were aware of two events involving spillage of the cyanide solution at the site. One event reportedly occurred as a result of a manhole overflowing when the solution was being pumped to the municipal sewers. This led to an inspection of the facility and discussion regarding the operation with Mr. Helterbrand on September 17, 1985. Mr. Helterbrand indicated the spill areas had been treated with sodium hyperchlorite. Information obtained on September 17, 1985 was included in the Preliminary Assessment Report dated September 19, 1985.

E. Remedial Actions/Permit and Regulatory History

The Dugan & Helterbrand Company received Resource Recovery Certification to operate the silver recovery operation on January 24, 1984. In July, 1984, Mr. Helterbrand was advised of the change in regulations that no longer required resource recovery certification for the recovery of precious metals.

On April 30, 1985 an Abatement Order was issued to Mr. Helterbrand and the Dugan & Helterbrand Company. The order required the following corrective action.

1. cease disposal of the film chips at any facility not permitted to receive hazardous wastes,
2. register all hazardous wastes generated/stored at the facility,
3. store hazardous wastes in accordance with the storage regulations, and
4. comply with all generator requirements in the state regulations.

The Department of Natural Resources also required analyses of each batch of film chips prior to disposal. Samples were submitted to two labs and results compared prior to approval to dispose of the chips.

An inspection was conducted on September 17, 1985 to determine whether or not Dugan & Hilderbrand was in compliance with the Resource Conservation and Recovery Act requirements. The inspection indicated it was.

Dugan & Helterbrand changed this process to eliminate the cyanide process. The Water Pollution Control Program then required pretreatment analyses for the wastewater being discharged to the municipal sewers. Final determination on the analyses required has not yet been made.

F. Site Inspections and Sampling Trip Summary

The site was revisited on December 17, 1985 to determine the extent of the spill areas and to collect samples. Mr. Joe Rowe of the Waste Management Program, Mr. Sam Brenneke of the Laboratory Services Program and Mr. Charles Kroeger of the Springfield Regional Office, Missouri Department of Natural Resources participated. Mr. Gary Hamilton of the Dugan & Helterbrand Company pointed out the spill areas at both the north building and the underground storage tank.

Two samples were collected from each of the spill areas. Samples were returned to the Laboratory Services Program by the sampling personnel.

There was no evidence of vegetative stress that could be attributed to the spills. Mr. Helterbrand indicated that there had been earth work done around the spills and some of it may have been covered with concrete.

The lab results indicate less than 1 UG/G for all samples except for one sample collected ten feet below the buried tank to the south of the operations building. The results on that one sample indicated a level of 97.3 UG/G cyanide as analysed by Environmental Analysis, Inc. Copies of the analytical results are attached.

III. ENVIRONMENTAL SETTING

A. Topography

The Dugan and Helterbrand Site is located on a summit dividing three watersheds - the Niangua, the Pomme de Terre and the James. The area around the site is relatively flat with average slope of less than 3%. Elevation at the site is 1,490 feet above mean sea level with the drainage towards Turnbo Creek which is tributary to the James River. Marshfield is surrounded by rolling hills which change to steeper sloped hills and valleys.

B. Surface Water

Three watersheds originate within 1/4 mile of the site. Turnbo Creek which discharges to James River has its headwaters south and east of the site, the Pomme de Terre River headwaters are to the east and the West Fork of the Niangua River originates to the North of the site. None of the streams are felt to be threatened by the site.

The topographical map indicates there is a farm pond about 1/2 mile down the Turnbo Creek drainage from the site. Runoff from the site would mix with parking lot runoff, pastureland runoff and industrial site runoff from two to three other plants before entering the aforementioned pond.

C. Geology, Soils and Groundwater

The site is underlain by the Swan Creek sandstone member of the Cotter Dolomite. This is the aquifer of concern and it is located at a depth of 30 to 60 feet. The Cotter Dolomite is made up of cherty dolomite with shale and sandstone beds.

The surface soil is Wilderness Cherty silt loam overlying moderately thick cherty, silty clay residuum which was derived from the dolomite bedrock. Permeability of the Wilderness soil is 0.06 to 6.0 in./hr. = 4.2×10^{-5} to 4.2×10^{-3} cm/sec. The residuum has moderate to high permeability estimated to be approximately 1.0×10^{-3} cm/sec.

The Cotter Dolomite aquifer is used as a domestic water supply for private wells in the area. There are however no known private wells within 3/4 mile of the site.

Slope of the terrain at the site is about 2% toward Turnbo Creek which feeds into the James River. The receiving streams below the site appear to be gaining.

D. Climate

Meotorological data for this region is as follows:

Temperatures -

Average Summer	76	degrees F.
Average Winter	36	degrees F.
Low Record	-29	degress F.
High Record	113	degress F.

Precipitation -

Average Yearly Rainfall	41	inches
Heaviest 24-hour Rainfall Event	6.85	inches
Average Snowfall	16.9	inches

Winds -

Prevail from south

Solar Index -

Summer 70%
Winter 50%

E. Land Use

The area within one mile of the site is generally residentially to the north and east, industrial in the immediate vicinity to the south and west, and pastureland with scattered rural residences further south. There are small acreages of pastureland scattered to the north and east such as the five or so acres adjacent to the site.

Except to the east, where the City of Marshfield is centered, most of the land one to five miles from the site is utilized as pastureland consisting of cleared and seeded ridge tops and gentle rolling valleys.

F. Population Distribution

The 1980 census figures indicate the population of Marshfield is approximately 3,900 people. The center of the population, according to a 1982 topographic map, is about one mile northeast of the Dugan and Helterbrand Site. South of the site is a rural setting with about 12-15 residences per square mile decreasing to less than five as you travel south.

G. Water Supply

The City of Marshfield provides water to residences, businesses, and industries within one mile of the site. Beyond that private wells are the primary drinking water source. The nearest Marshfield well is located about 1/4 miles to the west of the site but because of its construction and the geology of the immediate area and the small amount of contaminants present, no adverse affects are expected on the water supply.

H. Critical Environments

There are no known sensitive environments or habitats within the vicinity of the site.

IV. WASTE CHARACTERIZATION

A. Waste Quantities and Type

Analyses of the soil for cyanide in the two spill areas indicates the presence of the contaminant in concentrations below 1 ppm in the north spill area and up to 973 ppm cyanide in the drainage below the underground storage tank. The sample from the area near the opening to the underground storage tank had a concentration of .932 ppm. The estimated volume of soil with concentrations of greater than 1 ppm is less than five cubic yards although considerably more soil sampling would be required to determine the exact amount of contaminated soil. The Report of Sampling Analyses is attached.

B. Disposal Methods and Locations

Although actual disposal of cyanide waste did not take place at the site, spills of cyanide contaminated solutions resulted in the deposition of cyanide contaminants at the site. The attached site map shows the location of the two spill sites, one on the north west corner of the East Process Building and one at the Southeast corner of the West Process Building.

The north spill area is partially covered by concrete slab now and the dirt may have been somewhat disturbed. Samples were collected of the soil at the edge of the slab and about 25 feet to the west in the shallow drainage from the site. As stated earlier both samples showed cyanide concentrations at less than 1 ppm.

The south spill area, which reportedly was a result of an underground storage tank overflow, lies adjacent to the property line and at the drainage point from the processing and storage areas of the plant. The highest concentration of cyanide was in the drainage below the tank where it joined the drainage from the rest of the plant.

Toxicological Data

"Cyanide can effect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. Sufficient cyanide may be absorbed through the skin, especially if there are cuts, to cause fatal poisoning."

"Cyanide is a potent and rapidly acting chemical asphyxiant which prevents tissue utilization of oxygen. The critical organs are those which are sensitive to oxygen lack, notably the brain and heart. A transient stage of central nervous stimulation is followed by central nervous depression and, finally convulsions and death due to respiratory arrest. With the ingestion of cyanide salts, death may be delayed as long as one hour."

Hydrogen cyanide in an aqueous solution is readily absorbed from the skin and from all mucous membranes but the alkali salts are usually toxic only when digested. The average lethal dose of HCN taken by mouth is believed to lie between 60 and 90 mg; this corresponds to about one teaspoonful of 2% solution of hydrocyanic acid and to about 200 mg. of potassium cyanide.

Absorbed cyanide is in small measure excreted unchanged by the lungs. Cyanide given in daily doses to rats produced no mortality due to cumulative actions though thyroid changes have been reported following long-term exposure to cyanides.

At low levels of exposure, the early symptoms include weakness, headache, confusion, nausea, and vomiting. Milder forms of intoxication may result only in weakness, dizziness, headache, and nausea.

Long term exposure (chronic exposure) effects are non-specific and rare.

Respectfully Submitted:

Charles L. Kroeger
Environmental Specialist

